


Promoting Grid Connected RE System and Recent Activities of Energy Conservation in Chinese Taipei

APEC Workshop on Recent Advances in Utility Based Financial Mechanisms that Support Renewable Energy and Energy Efficiency



Promoting Grid Connected Renewable Energy System and Recent Activities of Energy Conservation in Chinese Taipei

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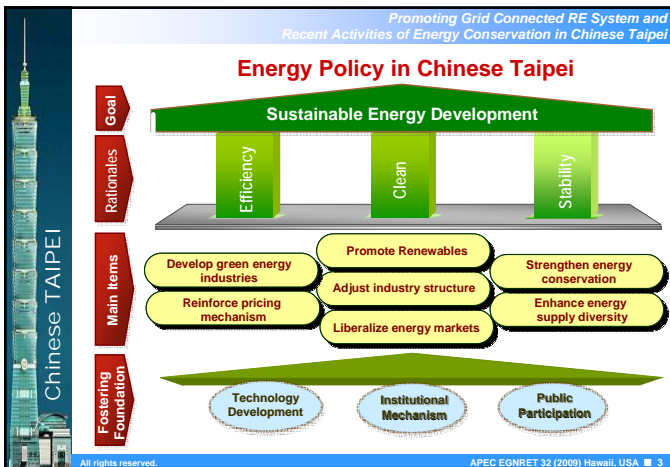
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Part I. Promoting Grid Connected Renewable Energy System

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Targets of Renewable Energy Promotion

➔ Renewable energy shall contribute 15%, in terms of installed capacity by 2025.

Renewables	2008		2025	
	Installed Capacity (MW)	Rate (%)	Installed Capacity (MW)	Rate (%)
1. Hydropower	1,939	5.0	2,500	4.4
2. Wind Power	358	1.0	3,000	5.3
3. Solar PV	4.1	0.0	1,000	1.8
4. Geothermal	-	-	150	0.3
5. Biomass	772	2.0	1,400	2.5
6. Fuel Cell	-	-	200	0.4
7. Ocean Energy	-	-	200	0.4
Total	3,073	8.0	8,450	15.1
8. Solar Thermal Water Heater	1.78 million m ²		4.09 million m ²	

Source: BOE (2009)

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Incentives for Renewable Energy in Chinese Taipei

Type	Incentives	Current Status
Electricity Purchase Program	Taipower Renewable Energy Premium Purchase Program	1. Purchase price is US\$ 0.063/kWh. 2. The approved purchase capacity has reached 298 MW. 3. Total purchase capacity will be 600 MW.
Solar PV	Solar PV Systems Demonstration Program	1. Subsidy: US\$ 4,700 /kW; 50% of installation cost max 382 2. demonstration projects with an installed capacity of 4.099 MW.
Biogas	Biogas Power Generation: Landfills specified	Electricity generated from biogas of landfills being granted with a premium of US\$ 0.0156/kWh
	Biogas Power Generation: General	1. Grants up to US\$1,000/kW for new generators 2. Installed capacity must exceed 300 kW (could be completed by Nov 30, 2009) 3. Ceased by end of 2008

Source: BOE (2009) (cont.)

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Incentives for Renewable Energy in Chinese Taipei

(cont.)

Type	Incentives	Current Status
Tax Incentives	Statute for Industrial Upgrade	1. Business entities investing in new and clean energy can enjoy a tax credit up to 7% of the equipment cost. 2. Investments in new and clean energy industry can enjoy income tax credits, ranging from 10%–20% of the investments. 3. Two-year accelerated depreciation. 4. Low interest loans : up to the 2-year postal saving floating interest rate, plus 2.45%.
	Business Entities Purchasing Energy Saving Equipment or Using New Energy Equipment or Technology Tax Credits	
	Customs Duty	

Source: BOE (2009)

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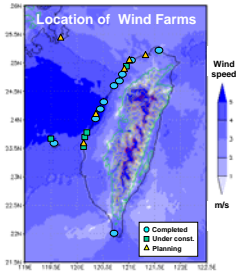
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Grid Connected Wind Turbines

Status -

- At the end of 2008, 190 wind turbines had been installed, corresponding to a total capacity of 358 MW.
- The First Phase of Development Project on Offshore Wind Energy has been approved by the Executive Yuan (Cabinet)

Targets - 3,000 MW by 2015

Source: BOE (2009)

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Grid Connected Solar PV System

Status -

- 382 demonstration projects with the installed capacity of 4.099 MW at the end of 2008.
- Subsidy upto US\$ 4,700/kW, 50% of installation cost maximum.

Targets - 1,000 MW by 2015



Fu-Bon Memorial Building, 19.8 kW

Source: BOE (2009)

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Grid Connected Solar PV System

Main Stadium for 2009 World Game, Kaohsiung



Installed Cap.: 1 MWp
Generation: 1,100 MWh/year

Source: KOC (2009)

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2008 APEC Photovoltaic Conference

October 7-9, 2008 Taipei World Trade Center

Background

- APEC Economies area owns **the biggest capacity** of solar cell production in the world.
- APEC Economies has become the most important sectors of supply chain in the solar energy.

Purpose

- To establish infrastructure for the utilization of PV energy in the APEC region.
- The 2008 APEC PV Conference provides a timely **platform** and **opportunities** for all APEC Member Economies to address PV promotion issues, discuss technology development, exchange information and experience of promotion scheme in the region.

11 APEC Economies represented

- Australia, China, Hong Kong, Japan, Mexico, Malaysia, Singapore, Thailand, USA, Vietnam and Chinese Taipei

Source: BOE (2008)

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2008 APEC Photovoltaic Conference

Conclusions

- 1 Sharing of information at both government and industry levels to be continued
- 2 Keeping the APEC PV agenda moving forward
- 3 Compilation of information and opinions collected from represented member economies to be done and distributed back to allow APEC economies to set common benchmarks
- 4 Standardization of training materials and certification of PV engineers and technicians; existing lengthy and inconsistent verification processes must be made more efficient
- 5 Financing issues not adequately explored; requiring more discussion in the future
- 6 Build on past APEC projects and workshops
- 7 Report results to the EGNRET 31 Meeting and the 36th EWG Meeting



Source: BOE (2008)

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Grid Connected Biogas Power System

Status -

- Operational biogas power generation systems include four landfill sites, three industrial wastewater treatment plants, and some pig farms, with a total installed capacity of 22.4 MW.

Targets -

- It is estimated that there still are six landfill sites with a potential installed capacity of more than 21.2 MW. Biomass energy targets is 1,400 MW by 2015.



Sanzhuku Sanitary Landfill Site, Taipei

Capacity: 6.81 MW
Treatment: 4,256 m³/hr (1 atm, 25°C)

17.33 Mm³/yr Biogas (2003)

Photo: TEPA (2001) ; Source: ITRI (2008)

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Renewable Energy Development Bill (Draft)

- The Bill has been approved by the Economic Commission of Legislative Yuan and waiting for final approval.
- Obligations: power utilities to grid integrating and buying in of renewable electricity; public constructions to install PV
- Incentives: fixed feed-in tariffs for renewable electricity; installation subsidies for the public using renewables from PV fuel cells and hydrogen
- Deregulation: loosening limitations of land use; unbinding qualification for installing renewable power facilities
- Specific Fund supporting finances: power utilities using fossil and nuclear fuels should render funding as monetary sources of subsidies to reduce the impact to government budget

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Renewable Energy Development Bill (Draft)

- Renewable Energy Development Fund—the principle of balancing revenue and expenses based on projected need for subsidies
 - Subsidy for feed-in tariffs (expenses): subsidizing the differences between feed-in tariffs and Taipower's avoided cost
 - Feed-in tariffs: the government establishing a commission consisted of scholars and experts to decide pricing formula, tariffs, and make announcement annually
 - Fund levying (revenue): based on the estimation of subsidizing needs to levy funding from Taipower, IPP and the higher capacity co-generators

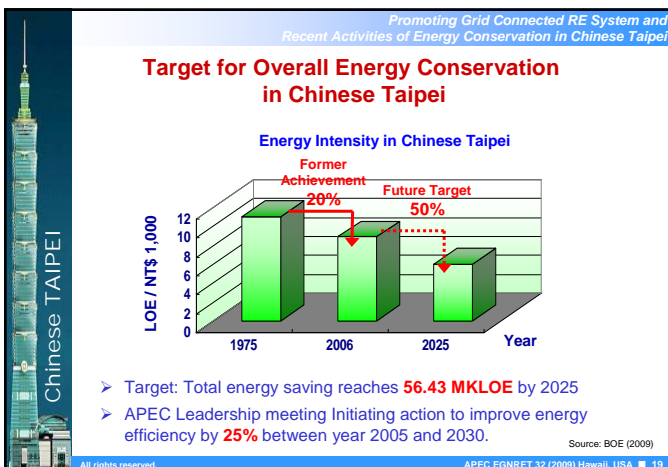
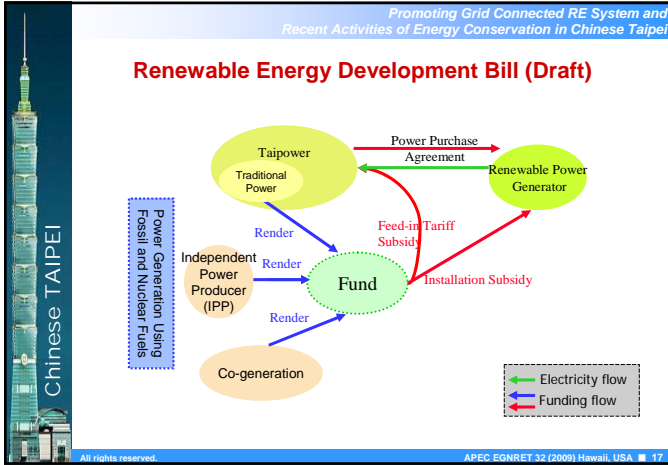
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Renewable Energy Development Bill (Draft)

- Measures to promote installation—increasing installed capacity, facilitating technological improvement and reducing costs
 - Demonstration subsidy (expenses): those who install PV, fuel cells and hydrogen generators eligible to apply for subsidy
 - Incentive subsidy: those who install solar water heaters eligible to apply for subsidy (alternative to thermal utilization and supported by Oil Fund)
 - Public constructions obligated to be installed with PV systems

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- ### Action Plan for Energy Conservation in Energy Sector
- #### Raising Efficiency of Transmission: Saving 5.4 MKLOE/yr
- Replacing with high-efficiency generating units for coal-fired power plant (Efficiency raised by 3.5%) by 2025
 - Replacing with high-efficiency generating units for gas-fired power plant (Efficiency raised by 5.5%) by 2025
 - Improving power patch/transmission facilities (Reducing line lost by 0.5%) by 2015
-
- Taichung Coal-Fired Power Plant (Photo: Chi Po-In, 2007)
- Source: BOE (2009)
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Energy Audit and Incentives for Energy Conservation Technologies

- Promoting the application of Building Energy Management System
- Promoting the use of renewable energy
- Promoting the auditing and benchmarking system to control the building energy consumption
- Promoting and setting up a incentive mechanism for designers implementing energy efficiency design such as tax deduction, low interest rate loan and multiplying the design fee, etc.
- Promoting ESCO

Source: BOE (2009)

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Approach of current energy audit in Taiwan

- Preliminary Audit** (1 ~ 2 days)
 - Checking Energy Use and Energy Management in Factories
 - Review the Need on ESCO Service
- Preliminary Suggestion** (Free)
 - Verifying on the Savings and Benefits of Preliminary Suggestion
 - Verifying the Needs on ESCO Service
- Detail Energy Audit** (Days to weeks)
 - Measuring and Collecting the Detailed Data
 - Energy Audit for Planning the Further Service
- Verification and Modification on Improvement Plan** (Charged)
 - Check the Contents of ESCO Services:
 - Baseline Setting, Scheduling, Monitoring & Verification Methods
 - Guarantee for Guaranteed Saving Performance
 - Operational Management and Maintenance
 - Contract Duration
- Contracting** (Charged)
- Improvement Actions**
 - ESCO's Activities on Improvement Engineering
- Project Completion**
 - ESCO Services:
 - Monitoring & Verification
 - Operational Management
 - Maintenance & Checking
 - Checking & Verifying the Savings by contract
 - Operational Management & Maintenance for Good Performance

Source: BOE (2009)

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Other Activities of Energy Conservation

Encourage of Appliance Replacement

- From Oct. 1, 2008, a total budget of NT\$ 530 millions is provided by the government to encourage the replacement of old & lower efficient appliances (e.g., air-conditioner, refrigerator, and clothing washer).
- Purchasing the high efficient products with energy conservation label, a total amount of **NT\$ 2,000** (~US\$ 60) per item cash rebate will be granted.
- The program will be executed for 6 months and only apply to the domestic manufactured products.

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Other Activities of Energy Conservation

Energy Conservation & Carbon Reduction

- The government initiates an electricity price privilege program in order to expedite energy conservation.
- Discount electricity bill will be provide to residential sector, and middle and elementary schools, the program started on July 1, 2008.

$$X\% = (A - B) \div A \times 100\%$$

where A= bi-monthly power consumption for the previous year;
B= bi-monthly power consumption for this year

Saving span	Discount rate
$0 \leq X < 5\%$	95%
$5\% \leq X < 10\%$	90%
$10\% \leq X$	80%

Source: BOE (2009)

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Concluding Remarks

- Accelerate the enactment of Renewable Energy Development Bill to establish a sustainable environment.
- Adjust the premium tariffs for renewable energy and rationalize energy prices of fossil fuels taking into account their external costs.
- Remove the obstacles in grid connection and power transmission to promote the power generation from renewables.
- Enhance energy productivity, and stress on energy conservation continuously.



Photo: KOC (2009)

Main Stadium for 2009 World Game, Kaohsiung, Chinese Taipei

Thank you for your attention.

